CLAIMS

WHAT IS CLAIMED IS:

1. A light integrating system comprising:

at least one total internal reflection (TIR) prism; and

a light integrating device disposed to collect and homogenize light exiting from said TIR prism.

2. The system of claim 1, further comprising two or more light sources for emitting light into said light integrating system.

3. The system of claim 1, wherein surfaces of said at least one TIR prism that are not on an optical axis of said system have an aluminized coating to minimize light loss.

4. The system of claim 1, wherein said light integrating device comprises a light integrating tunnel.

5. The system of claim 4, wherein said light integrating tunnel has a rectangular cross-section.

6. The system of claim 4, wherein said light integrating tunnel has reflective material on inner walls of said tunnel for reflecting and homogenizing light from said TIR prism.

7. The system of claim 1, wherein sad light integrating device comprises a light pipe.

8. The system of claim 1, wherein said light integrating device comprises a solid light conducting rod.

9. The system of claim 1, wherein said light integrating device comprises a condenser lens system.

10. The system of claim 1, further comprising a plurality of optical elements that are optically coupled and have an optical axis, wherein said TIR prism is formed at an interface between two of said optical elements.

11. The system of claim 1, further comprising a plurality of TIR prisms disposed along an optical axis, wherein each subsequent TIR prism has a steeper angle than a previous TIR prism along said optical axis.

12. The system of claim 1, further comprising a plurality of TIR prisms disposed in a line along an optical axis with a reflector at one end of said line of TIR prisms for reflecting light back along said optical axis through said TIR prisms.

13. The system of claim 12, further comprising a first set of light sources disposed along one side of said line of TIR prisms and a second set of light sources disposed along an opposite side of said line of TIR prisms.

14. The system of claim 1, further comprising a plurality of TIR prisms disposed along an optical axis and a plurality of light sources disposed to emit light into said TIR prisms such that said TIR prisms integrate light from said light sources.

15. The system of claim 1, further comprising a first plurality of TIR prisms disposed along an optical axis and a second plurality of TIR prisms, each of which is disposed adjacent to and optically coupled to one of said first plurality of TIR prisms.

16. The system of claim 15, further comprising two light sources disposed with each of said second plurality of TIR prisms, wherein each of said

second plurality of TIR prisms receives and integrates light from two light sources.

17. A method of integrating light comprising:

emitting light from two or more light sources into one or more total internal reflection (TIR) prisms disposed along an optical axis; and

homogenizing light directed through said TIR prisms with a light integrating device that collects light exiting from said TIR prisms.

18. The method of claim 17, wherein said step of homogenizing light further comprises reflecting light on inner walls of said light integrating device.

19. A method of correcting a color of a light source comprising:

emitting light from a first light source into a total internal reflection (TIR) prism;

emitting light from a second light source into said TIR prism; and

integrating light from said first and second light sources with said TIR prism;

wherein light from said second light source has a color substantially lacking from the light from said first light source.

20. The method of claim 19, wherein said first light source is a projection lamp and said second light source is a red light source.

21. A light integrating system comprising:

at least one total internal reflection (TIR) prism disposed along an optical axis; and

a reflector disposed along said optical axis for reflecting light from said TIR prism back through said TIR prism and down said optical axis.

22. The system of claim 21, further comprising a plurality of TIR prisms disposed along said optical axis.

23. The system of claim 22, further comprising a light integrating device disposed on an opposite side of said TIR prisms from said reflector, said device being configured to collect and homogenize light exiting from said TIR prisms.

24. The system of claim 23, wherein said light integrating device comprises a light integrating tunnel having reflective material on inner walls of said tunnel for reflecting and homogenizing light from said TIR prism.

25. The system of claim 23, wherein said light integrating device comprises a light pipe.

26. The system of claim 23, wherein said light integrating device comprises a condenser lens system.

27. The system of claim 21, further comprising a plurality of optical elements that are optically coupled along said optical axis, wherein each TIR prism is formed at an interface between two of said optical elements.

28. The system of claim 22, wherein each subsequent TIR prism has a steeper angle than a previous TIR prism along said optical axis.

29. The system of claim 22, further comprising a first set of light sources disposed along one side of said plurality of TIR prisms and a second set of light sources disposed along an opposite side of said plurality of TIR prisms.

30. The system of claim 29, wherein one of said first set of light sources and one of said second set of light sources emit light into opposite sides of a single TIR prism.

31. A light integrating system comprising:

a first plurality of total internal reflection (TIR) prisms disposed along an optical axis; and

a second plurality of TIR prisms, each of which is disposed adjacent to and optically coupled with one of said first plurality of TIR prisms.

32. The system of claim 31, further comprising two light sources disposed with each of said second plurality of TIR prisms, wherein each of said second plurality of TIR prisms receives and integrates light from two light sources.

33. The system of claim 31, further comprising a light integrating device disposed to collect and homogenize light exiting from said TIR prisms along said optical axis.

34. The system of claim 33, wherein said light integrating device comprises a light integrating tunnel having a reflective material on inner walls thereof for reflecting and homogenizing light from said TIR prisms.

35. The system of claim 33, wherein said light integrating device comprises a light pipe.

36. The system of claim 33, wherein said light integrating device comprises a condenser lens system.

37. The system of claim 31, further comprising a plurality of optical elements that are optically coupled along said optical axis, wherein TIR prisms are formed at interfaces between two of said optical elements.

38. The system of claim 31, further, wherein each subsequent TIR prism has a steeper angle than a previous TIR prism along said optical axis.

39. A light projection system comprising:

a projection lamp;

a colored lighted source; and

a total internal reflection prism receiving light from both said projection lamp and said colored light source;

wherein light from said projection lamp and said colored light source is blended by said total internal reflection prism to produce a projection light beam.

40. The system of claim 39, further comprising a light integrating device optically coupled with said total internal reflection prism, wherein said projection light beam is made spatially uniform in said light integrating device.

41. The system of claim 39, wherein said colored light source has a frequency range over which said projection lamp has a lower intensity than other parts of a visible frequency spectrum.

42. A light integrating system comprising:

at least one total internal reflection (TIR) prism;

at least two light sources disposed to emit light into said at least one TIR prism; and

means for collecting and homogenizing light exiting from said at least one TIR prism.

43. The system of claim 42, wherein said means comprise a light integrating tunnel having reflective material on inner walls thereof for reflecting and homogenizing light from said TIR prism..

44. The system of claim 42, wherein said means comprise a light pipe.

45. The system of claim 42, wherein said means comprise a condenser lens system.

46. A system for correcting a color of a light source comprising:

means for emitting a first light;

means for emitting a second light; and

a total internal reflection prism for integrating said first and second lights;

wherein said second light has a color substantially lacking from said first light.

47. The system of claim 46, wherein said means for emitting said first light include a projection lamp and said means for emitting said second light include a red light source.

48. The system of claim 46, further comprising means for homogenizing light exiting from said total internal reflection prism.

49. A light integrating system comprising:

at least one total internal reflection (TIR) prism disposed along an optical axis; and

means for reflecting light disposed along said optical axis for reflecting light from said TIR prism back through said TIR prism and down said optical axis.

50. The system of claim 49, further comprising a plurality of TIR prisms disposed along said optical axis.

51. The system of claim 50, further comprising a light integrating means for collecting and homogenizing light exiting from said TIR prisms on an opposite side of said TIR prisms from said means for reflecting.